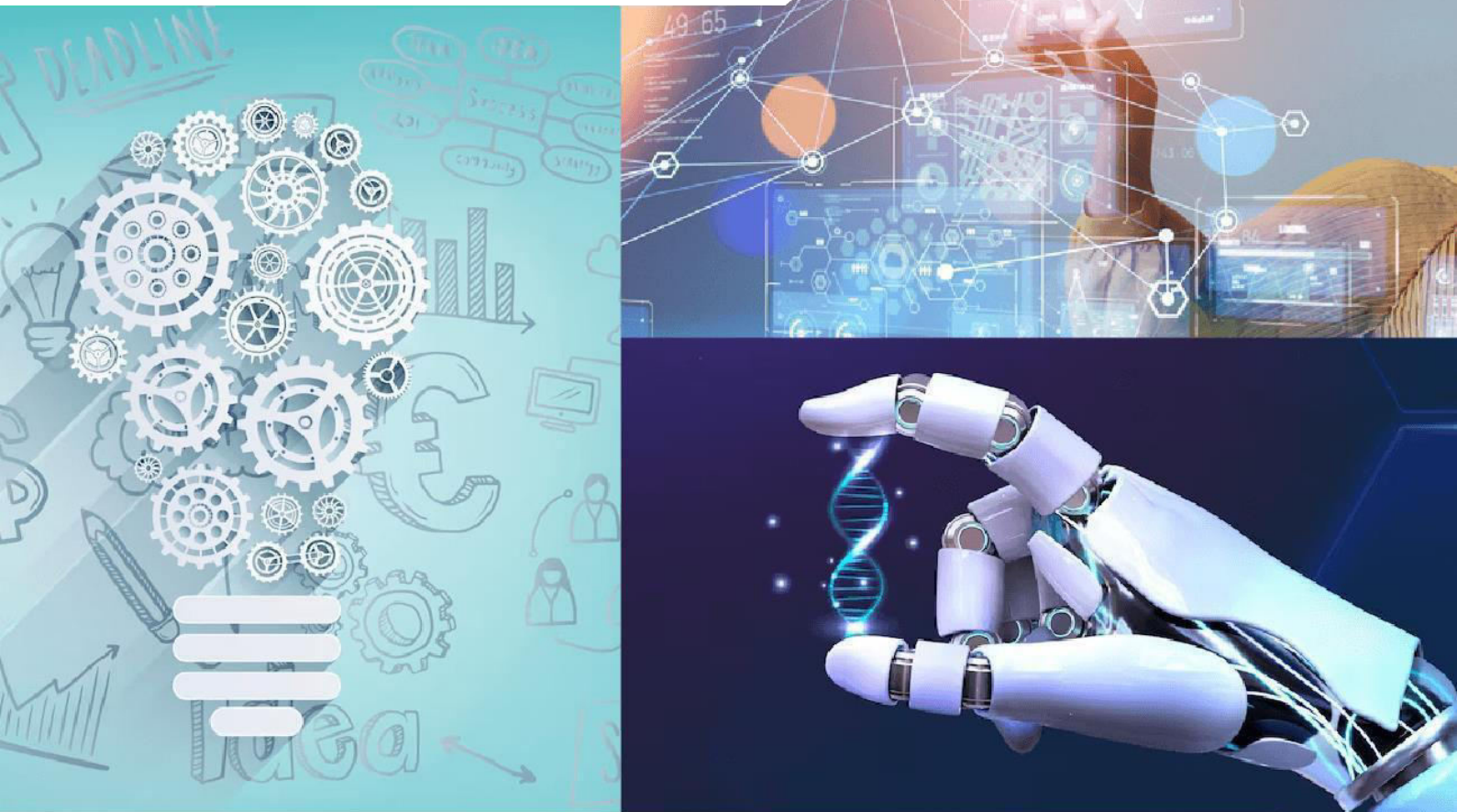




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Grains, Gaps and Governance: A South Delhi Case Study on Public Distribution System

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ABSTRACT: The title of the Dissertation "Grain, Gaps and Governance: A South Delhi Case Study on Public Distribution System" covers the functions of the Public Distribution System as per the National Food Safety Act, 2013. The dissertation conducted research on the population of 135 Beneficiaries including 30 Fair price shop. In the Article, The suffering came across the population who are migrant and doing ruff or tuff work like Construction workers, labours working for industrial material (mostly female). The authentication devices like e-POS (Electronic Point of Scale) and IRIS scanner are unable to find their identity due to industrial damage of fingerprint, and iris problems in old age. As per the correlation with five hypothesis some relations proved insignificant, and rest are showing the proper relationship in between the variables covering regions and technological gaps showed as a factor in grain allocation to the beneficiaries. While, resolving the technological gaps and distribution shops nearby to its location where the majority needy population resides will be more helpful to needy population. In the study, the recommendation showed that implementing technology alternative to the needy population where the problem of the identification proof needed to be resolved to maintain better food security supply to each individual and providing the home based or PDS ATM type machine could help better facilitating the supply across the region and safeguard the situation by managing its resources carefully. This Highlights the problems of gaps in distribution, policy making, and technological integration in the process of Supply chain. As per the study, the conclusion showcases a requirement for better integration of cold chain, efficient redressal mechanism and Technological with traditional approach when it comes to ground level operations.

KEYWORDS: Growth, Labour, Cold Chain, Technology, Beneficiaries, Problems, Redressal, Supply Chain, Authentication.

I. INTRODUCTION

The National Food Safety Act launched as a medium to guarantee as a law in the food supply to the marginalised population in the society. It launched on 5 July 2013 as a under universal Public Distribution System. Public Distribution System introduced after independence to fulfil basic hunger of India Population, gradually expansion has been seen across the timeline from 1960, 1970, From 1997, it concentrated into a system of more targeted based like School mid-day meals, disaster prone area and many places. furthermore, year till it become a Universally Accepted System from Targeted based approach into the System. In the Article, analyses it has been observed that the modernization techniques lead to implementation problems for the beneficiaries who are falling under BPL (Below Poverty Line), Antyodaya Anna yojana, priority household and Annapurna yojana card for the needy people who are above 65 and falling under poor category. It concentrated on the trending situation where the technology is unable to detect the right consumers of PDS and lead to mismanagement in grain allocation. While analyses through SPSS software various tools being used for making it transparent what the real condition is and the part of real suffering people have, not just based on some marginal opinion but a real time statistically proven data as per 2026 generation.

Public Distribution System shall have the following objectives:

- The core objective of the scheme to eradicate poverty and fulfil the basic calory requirement of the individuals who are falling below the poverty level through enough subsidized nutritional grains.
- Satisfying the sustainable development goals-2 (No Hunger) which is essential in the developing economy as India, often leads to Maternal Death and nutritional deficiencies among adolescents and old age pensioners or citizen of India, rest women working under the field like labours.
- To create an environment where policy making smooths the process and integration of Artificial Intelligence and transparent infrastructure and better redressal system.

II. LITERATURE REVIEW

Inefficient Operation, Governance Gaps and Basic Nutrition

The System of Grain allocation started during World War II, watching the need for the basic hunger fulfilment in India and it has been designed to push the insecurities and malnutrition ((George & McKay, 2019; ‘Joshi & Pandey’, 2021). The Public Distribution System continuously challenged in ways: Multi level leakages, corruptions, illegal ration cards, redressal failures and conflicts in between FPS owners and Beneficiaries (Alam,2017; Sasi et,2014). Those process are primarily driven by the management failure and the Fair Price Shop owners do generally prefer their profitability over the prioritizing public service, that leads to systematic failure in implementation at ground level and intensifies food insecurity (Geoge, 2019;Balani,2013). The conditional approach could be resolved only when constitutional mandate to eradicate hunger works in its efficient approach at ground level rather than on pages. Targeting errors, bad inter-governmental coordination led to make condition more worsen to the poor (Sisodia,2022’; Pandey et,2020). Conditions seen during the beneficiaries like Antyodaya cardholders receive only half as per their allocated grains, it shows a ferocious cycle of malnutrition among vulnerable section of the society (Yadav, 2022; Shukla,2024).

Integrating Technology, Transparency

Modernised technological development reforms the systemic errors, acts a manipulation for many populations. It acts as a mandate that convert the failure of the government into a transparent outcome (Joshi,2021). Implementing the digital identification like Aadhaar Card linkages, e-ration cards and blockchain frameworks, helps government to track the records and improves the overhead burden in administration. It prevents the supply chain leakages, in between consumers to warehouse connecting a trustworthy relationship (Mishra, 2021).

Targeted Digital, Governance., Redressal Solutions

For resolving the suffering of basic needy populations, research provide the approach for targeted interventions and administrative reforms (Alderman et,2018; Sasi et,2024). Studies suggests a shift towards DBT (Direct Benefit Transfer) for significantly vulnerable section who can’t be able to bypass traditional, corruption-based supply chain. Adding more into the research suggests integration of Blockchain and RFID technology for better transparency and accountability while safe delivery to the neediest beneficiaries directly to their home (Mishra,2021). However Rigid technology like fingerprint scanner linked through e-POS System failed to recognise the individual which affects the overall chain and become a reason for conflict, here the requirement of a better redressal system come to the poster for supporting beneficiaries (Shukla,2024). Ultimately, while the digital resources are well equipped with modern day solution like e-governance, Aadhaar based tracking. The need of policymakers arises to actively bridge the gap between advanced digital system with ground level realities for protecting the marginalised and needy section of the populations (G, Diwakar,2025)

III. NEED OF THE STUDY

While earlier research analysed the micro level distribution strategy in this study it will evaluate the system highlighting the role in post digitalization era or after covid. Despite the integration of system like epos, scanner many challenges have been showing a gradual growth which leads to exclusion of deserving beneficiaries under the NFSA,2013. Apart from that worn fingerprint on paperwork and uncoordinated implementation led to suffering in the sectional population which is highlighting the operational bottleneck in tackling the corruption, administrative inefficiencies and weak redressal mechanism.

IV. OBJECTIVES OF THE STUDY

1. To study PUBLIC DISTRIBUTION SYSTEM governance and distribution gaps in South Delhi.
2. To evaluate issues and challenges of the beneficiaries.
3. To assess transparency, accountability, and technological integration in PUBLIC DISTRIBUTION SYSTEM operations.

V. HYPOTHESIS FOR THE STUDY

1. H0: There is no contribution of the distribution gaps while shortcomings of governance in the functioning of the PUBLIC DISTRIBUTION SYSTEM.
2. H0: There are no highlighted issues and challenges facing by the beneficiaries related to their entitlements.
3. H0: There is no significant effect in PUBLIC DISTRIBUTION SYSTEM operations in South Delhi due to limited transparency, accountability, and technological integration

4. H0: There is no effect in socioeconomic barriers prevents many eligible beneficiaries in South Delhi from fully accessing PUBLIC DISTRIBUTION SYSTEM services.
5. H0. There is no significant improvement shown in digital technologies showing the transparency and accountability within South Delhi's PUBLIC DISTRIBUTION SYSTEM operations.

VI. SCOPE OF THE STUDY

The secondary data has been collected from various government data as mentioned below whereas the study covers the 30 fair price shops in South Delhi as primary data collected through the questionnaire prepared for the personalities who is in regular touch with beneficiaries for distribution of grains. The study will get the chance to observe the change it had in terms of Grains, gaps and governance in India by a sample size of South Delhi.

VIII. RESEARCH METHODOLOGY

The Methodology used for the collection of the sample from the population, sample analysis and data interpretation are discussed below:

Primary Method: the data has been classified into various outcome questionnaire from the Beneficiaries (135) and Fair Price Shop Owners (15). The data collected from primary sources will be analysed from Descriptive Statistics, Chi-Square test, Spearman rank Correlation etc.

Secondary Method: the data collected from various authority like food corporation of India, national food safety act website, and through the Delhi government official websites.

VIII. STUDY AREA

South Delhi is also known as the hub for aspiring students as a royal city in Delhi. Its infrastructure and buildings and alignment are top notch but here lives many person who maintains the geography by working 10 hours a day each week, they are the labour population is slightly growing across the region by 2011 population census. Total number of sub-divisions (Tehsils) are shown as per the census 2011 and the district holds the 3 sub - divisions into various urban and rural clusters and village units, which are shown under:

- 1) Hauz Khas Division: It includes Hauz Khas, IIT Delhi, Safdarjung Enclave, Green Park, and Munirka.
- 2) Saket Division: It includes Chirag Delhi, Khiri, Saket, Pushp Vihar, Malviya Nagar, and the Saket Court complex.
- 3) Mehrauli Division: It includes Chhatarpur, Saidulajab, Satbari, Mehrauli, Lado Sarai, and Fatehpur Beri.

It consists of 42 villages (13 in Saket, 18 in Hauz Khas, and 11 in Mehrauli), 23 towns, 1 Municipal Corporation of Delhi). In South Delhi mostly areas are considered under the Urban locality where it provides the areas like Lal Dora, Fatehpur Beri which is away from the main highlight of the central part of south Delhi but holds the number of populations, it handles the areas like Chhatarpur and Saidulajab where it includes the prominent census zones also major municipal zones and planned urban colonies.

IX. ANALYSIS AND INTERPRETATION

Cross-Tabulation: Gender of the respondent in the quality of food grains.

Demographic Variable	Category	Frequency	Percent (%)	High Dissatisfaction (%)
Age	18–35 years	41	30.4	29.3
	36–45 years	66	48.9	31.9
	46–60 years	28	20.7	46.4

Demographic Variable	Category	Frequency	Percent (%)	High Dissatisfaction (%)
Gender	Male	41	30.4	34.2
	Female	94	69.6	34.1
Occupation	Daily wage	43	31.9	46.5
	Small trader	33	24.4	33.3
	Homemaker	39	28.9	20.5
	Others	20	14.8	35.0

Here, the cross tabulation showed the composition of the Male and Female in the beneficiaries' chart in the graph. Total beneficiaries counted to 135 where 41 are Male (30.4%) and Female population is 94 (69.6%) marking a huge contribution in the Public Distribution System. Most of the population lies in between the 'Sometimes' section around 28.1%, showing the complex nature of the quality in grains consumed by the people. Remaining are the percentage of the respondents both men and female category distributing in a tabular format for easy understanding.

A. Spearman Correlation for Distribution Gaps and Governance

Variables Tested	Respondent Group	Correlation (r)	Significance (p-value)	Result
Grain Shortage & Noticed Corruption	Beneficiaries	.016	.851	Not Significant
Timely Supply & Allocation Discrepancies	FPS Owners	-.161	.395	Not Significant

H₀: There is no contribution of the distribution gaps while shortcomings of governance in the functioning of the PUBLIC DISTRIBUTION SYSTEM.

Spearman Rank Correlation analysed to evaluate the relationship with the distribution gaps and governance shortcomings. At the side of Beneficiary, the correlation between experiencing grain shortages and noticing corruption is not showing significant value ($r = .016$, $p = .851$). On the side of FPS owner, the correlation showing in between the timely supply of food grains and noticed gaps in allocation was also not significant ($r = -.161$, $p = .395$). The complex nature of the Corruption where beneficiaries' pervasiveness reluctance to discuss make situation more difficult to address. Hence, we are unable to reject the null hypothesis for H₁ part.

B. Frequency Analysis of Beneficiary Issues and Challenges

Highlighted Challenge	Always	Often	Sometimes	Total Affected
Biometric / e-POS Failures	14.1%	20.7%	25.9%	60.7%
Distance & Travel Costs	13.3%	22.2%	25.2%	60.7%
Denied Ration due to Documents	8.9%	14.8%	31.9%	55.6%

Ho: There are no highlighted issues and challenges facing by the beneficiaries related to their entitlements.

A frequency analyses based on the concept to assess if beneficiaries face significant challenges. The results showed that most of the beneficiaries' experience suffering based on the factors. Specifically, 60.7% of replies being reported as biometric authentication issues 'Always', 'Often', or 'Sometimes'. Similarly, 60.7% face challenges related to distance or travel costs to the Fair Price Shop. Moreover, 55.6% have highlighted while facing the ration denial due to documentation issues sometimes. Because many the respondents highlighted these issues, that's why the null hypothesis H0 is rejected.

C. Spearman Correlation for Transparency and Accountability

Variables Tested	Respondent Group	Correlation (r)	Significance (p-value)	Result
Perceived Transparency & Noticed Corruption	Beneficiaries	.013	.881	Not Significant

Ho. There is no significant effect in PUBLIC DISTRIBUTION SYSTEM operations in South Delhi due to limited transparency, accountability, and technological integration.

A Spearman Rank Correlation is being analysed to find out the relationship between transparency and noticed corruption. The analysis derived that the relationship between the transparency and noticed corruption by the respondents or beneficiaries was not significant ($r = .013$, $p = .881$). The study suggests that the current transparency system showing irrelevant properties and failed to address problem at ground level. Therefore, we fail to reject the null hypothesis for H3.

D. Chi-Square Tests for Socioeconomic Barriers

Demographic Variable	Access Barrier Tested	Significance (p-value)	Result
Age	Difficulties due to Distance	.335	Not Significant

Demographic Variable	Access Barrier Tested	Significance (p-value)	Result
Age	Denied Ration (Documentation)	.631	Not Significant
Occupation	Difficulties due to Distance	.538	Not Significant
Occupation	Denied Ration (Documentation)	.677	Not Significant

Ho. There is no effect in socioeconomic barriers prevents many eligible beneficiaries in South Delhi from fully accessing PUBLIC DISTRIBUTION SYSTEM services.

A Chi-Square test is conducted to evaluate the impact of socioeconomic barriers on accessing PDS services. The relation between Age with the difficulties in accessing the FPS was not significant ($p = .335$), nor was the common situation between Age and ration rejection ($p = .631$). Similarly, Occupation showed no significant effect on access difficulties ($p = .538$) or ration denial ($p = .677$). Because all the p-values are more than 0.05, we fail to reject the null hypothesis. The data provides the suggestions that challenges occur in accessing the PDS are systemically working and affects beneficiaries across all age groups and occupations equally.

E. Spearman Correlation for Digital Technologies

Variables Tested	Respondent Group	Correlation (r)	Significance (p-value)	Result
Biometric Problems & Perceived Transparency	Beneficiaries	.200	.020	Significant
Tech Issues (e-POS) & Grain Discrepancies	FPS Owners	.472	.008	Highly Significant

Ho. There is no significant improvement shown in digital technologies showing the transparency and accountability within South Delhi's PUBLIC DISTRIBUTION SYSTEM operations.

A Spearman Rank Correlation is being conducted to evaluate the impact of digital technologies. On the Beneficiary side, there was a significant correlation in encountering biometric authentication problems and the perceived transparency in the system ($r = .200$, $p = .020$). On the FPS owner side, the analysis revealed a highly significant positive correlation via encountering technical issues (like e-POS malfunctions) and the frequency of gaps or discrepancies in grain allocation ($r = .472$, $p = .008$). Because $p < 0.05$, we reject the null hypothesis. The data truly formulates the reason for which it showed the technology can improvised the grain situation in real time monitoring by triggering biometric problems.

X. SUGGESTIONS/RECOMMENDATIONS

As per the study concluded in the research the implementation of the technology required better understanding and ground level survey also the rigid system of authentication identities can be reduced through OTP and smart cards which is mainly provided in a way to reduce the problem in the process of the PDS. Travel problem often leads to burden on beneficiaries in managing the distribution network and providing mobile PDS Van to the required areas in South Delhi. Also, IT supports will reduce the burden on the individual during the gaps in technical glitches. Introducing the simple WhatsApp or phone number-based grievance redressal system may improve the effectiveness of the system in flow of the resources.

XI. SCOPE OF FURTHER RESEARCH

Future study requires to expand the area of the survey to be expanded into major cities and highlight the distance as the issue and technological gaps when it comes in alignment of the problems with the marginalised level of the people who fall below BPL, or labour class. Required more analysis on IT infrastructure which should understand the basics of geopolitical situation suffering issues from sensors degradation, network connectivity etc. More focus is required in the vulnerable Demographic areas where the population suffers a lot and amount of hub for migrant and regular population like South Delhi where they may be a part of Exploitation.

XII. KEY FINDINGS

In the findings, it has been classified that the vulnerability of the Elders (40-60 years) and Labours suffered most reporting the highest dissatisfaction rate (over 46%) due to technological gaps and delay ration due to errors in inclusivity. Large portion of female beneficiaries seen in PDS process who generally visits for Fair Price Shops, leading the numbers and showing the capability as equal with Male but e-POS technology failed to identify beneficiaries (mostly women) due to tearing of fingerprint details (factors like House activity, construction sites, etc.) and become a victim of systematic exclusion. Dissatisfaction with poor quality of grains and structural issues like documentation linked grain denial has been identified by whole portion of the population can be women, men or with range factor from 18 to 60. The need for the strict hybrid solutions in grain allocation by managing its overall implementation in ground level. Alternative option like OTP, Grain ATM, enhanced license system, strict Quality Control Authority and efficient redressal system across the local regional level could boost the Grain distribution and maintain transparent, efficient Supply Chain in Ground Level.

XIII. CONCLUSION

In the study It reveals that the operational challenge in the region affects all the beneficiaries equally not only up to age or occupation. With over 60% of the beneficiaries suffering from distance, biometric authentication problems on the regularly basis. Here, the data showed that the technology as a double situation where at one side it is a helpful for the beneficiaries and at another side it is a machine malfunctional unit during the actual grain distribution at FPS shops. Transparency leads when the system works properly also, here is the reason for its loss, therefore digital tools is essential for better food safety ensuring proper utilisation of the material and effective Public Distribution System.

REFERENCES

- 1) ALAM, SHAKIR & KUMAR, PODDAR (2017). "A Study of the Food Security Management Through the Public Distribution System (PUBLIC DISTRIBUTION SYSTEM), (A Case Study of Darbhanga District), Shodhganga Research paper.
- 2) SASI, M, TEJASHREE, ROY, D, SAGAR (2024), "A Systematic Literature Review of the Public Distribution System in India", International Journal of Computer Applications (0975 – 8887) Volume 186 – No.39.
- 3) SHUKLA & SNEHLATA (2024). "Public Distribution System in Bhopal (A Critical Evaluation)", Shodhganga Research Paper.
- 4) MISHRA & MAHESHWARI (2021). "Blockchain in Indian Public Distribution System: a conceptual framework to prevent leakage of the supplies and its enablers and disablers", Journal of Global Operations and Strategic Sourcing, 10.1108/JGOSS-07-2020-0044.
- 5) GEORGE & McKay (2019). "The Public Distribution System and Food Security in India", International Journal in public health and Environment 2019, 16(17), 3221.
- 6) JOSHI & PANDEY (2021). "Public Food Distribution System in India: Evolution, Challenges and Way Ahead", International Research Journal of Humanities and Interdisciplinary Studies (IRJHIS).
- 7) ALDERMAN, GENTILINI, AND YEMTSOV (2018). Public distribution system in India. The 1.5 billion people questions, p.43.
- 8) PANDA, B. K., MOHANTY, S. K., NAYAK, I., SHASTRI, V. D., & SUBRAMANIAN, S. V. (2020). "Malnutrition and poverty in India: does the use of public distribution system matter?" BMC nutrition, 6(1), 41, P. 1-14.
- 9) Balani, S. (2013). Functioning of the public distribution system. PRS Legislative Research, New Delhi. Pp 4-7.
- 10) Yadav & Kumar (2022), "Public Distribution System and Food Security A study of Antyodaya Cardholders in Varanasi City", Shodhganga. Pp. 107-139.
- 11) Sisodia, Saumya (2022), "Ethics in Public Service Delivery System in India a Case Study of Public Distribution System in Allahabad District", Shodhganga. Pp. 59-80.
- 12) <https://censusindia.gov.in/census.website>
- 13) <https://nfsa.gov.in/portal/NFSA-Act>
- 14) <https://epds.nic.in>

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